REALTORS KNOW BEST:

An Analysis of Station Location and Permanence

Motivating Questions

- How do we define Smog Check stations?
- How uniform are the Smog Check stations within each classification?
- How rigid are Smog Check station classifications?

Finding Answers

- The answers to many questions can be found by looking at the time series of Smog Check inspections and station information
  - Looking at the past can shed light on how best to define Smog Check stations, as well as how stations classifications have evolved through out the Smog Check program

The Data

- Complete VID records from January 1, 1998 through December 31, 2006
  - This data consists of the over 113 million Smog Check inspections conducted over the entire state over the 9 year period
- Information for the over 20,000 Smog Check station IDs issued from January 1, 1998 through December 31, 2006
  - This information includes station name, and address and was extremely difficult to construct (thanks BAR!)

Why on Earth do we care about old station names and addresses?

- In wrestling with how to define Smog Check stations there are three possible criteria we can use:
  - Station ID which is currently used as the measure of a Smog Check station
  - Smog Check station name
  - Smog Check station location
- Using the time series of station information I can follow the evolution of individual stations as well as that of station classifications

Defining Stations By Location

- Allows for one station to have multiple IDs
- Station changes are easily identifiable from the consumer perspective
- Testing equipment and bays present a barrier to swift location changes

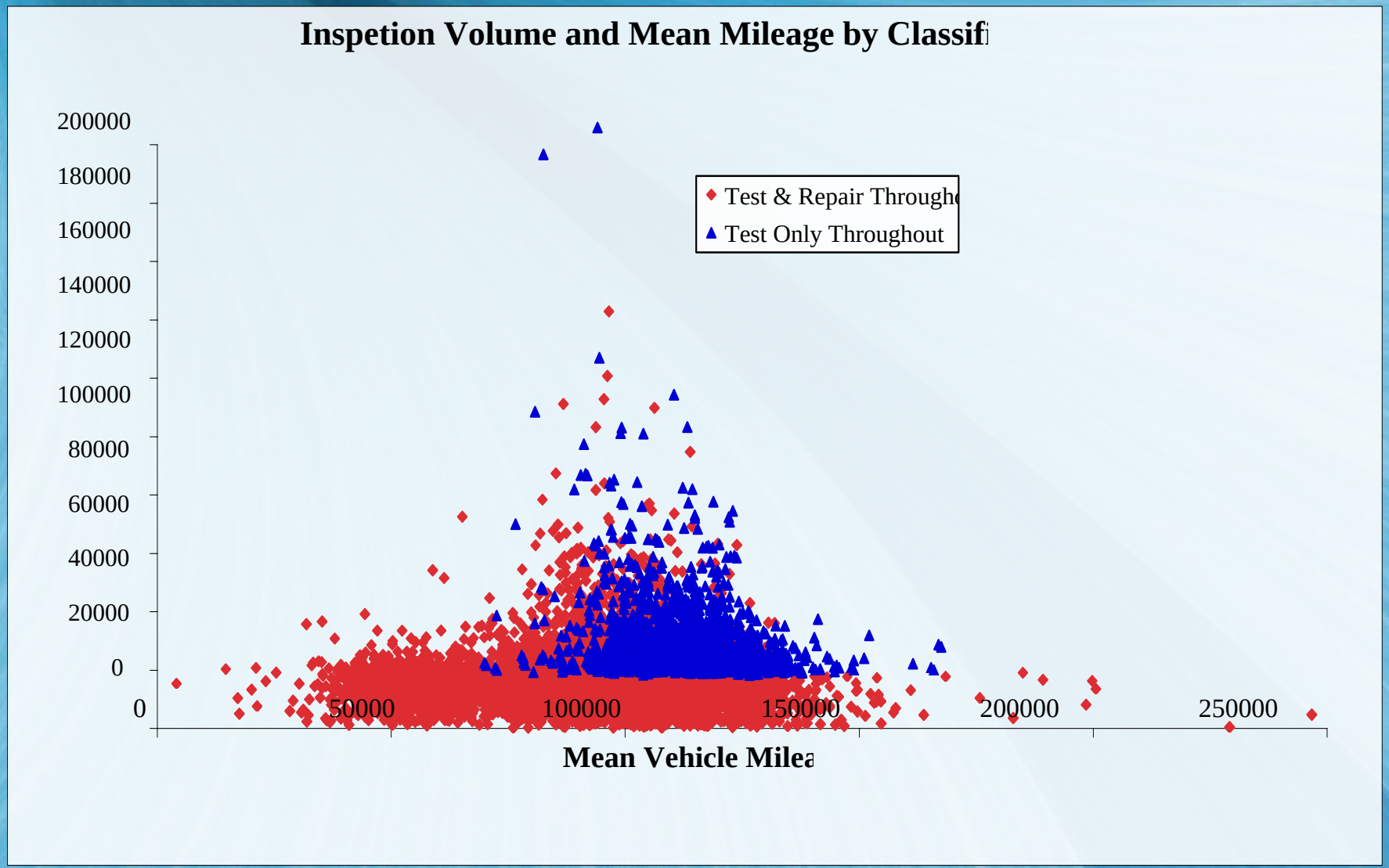
A New Station Definition

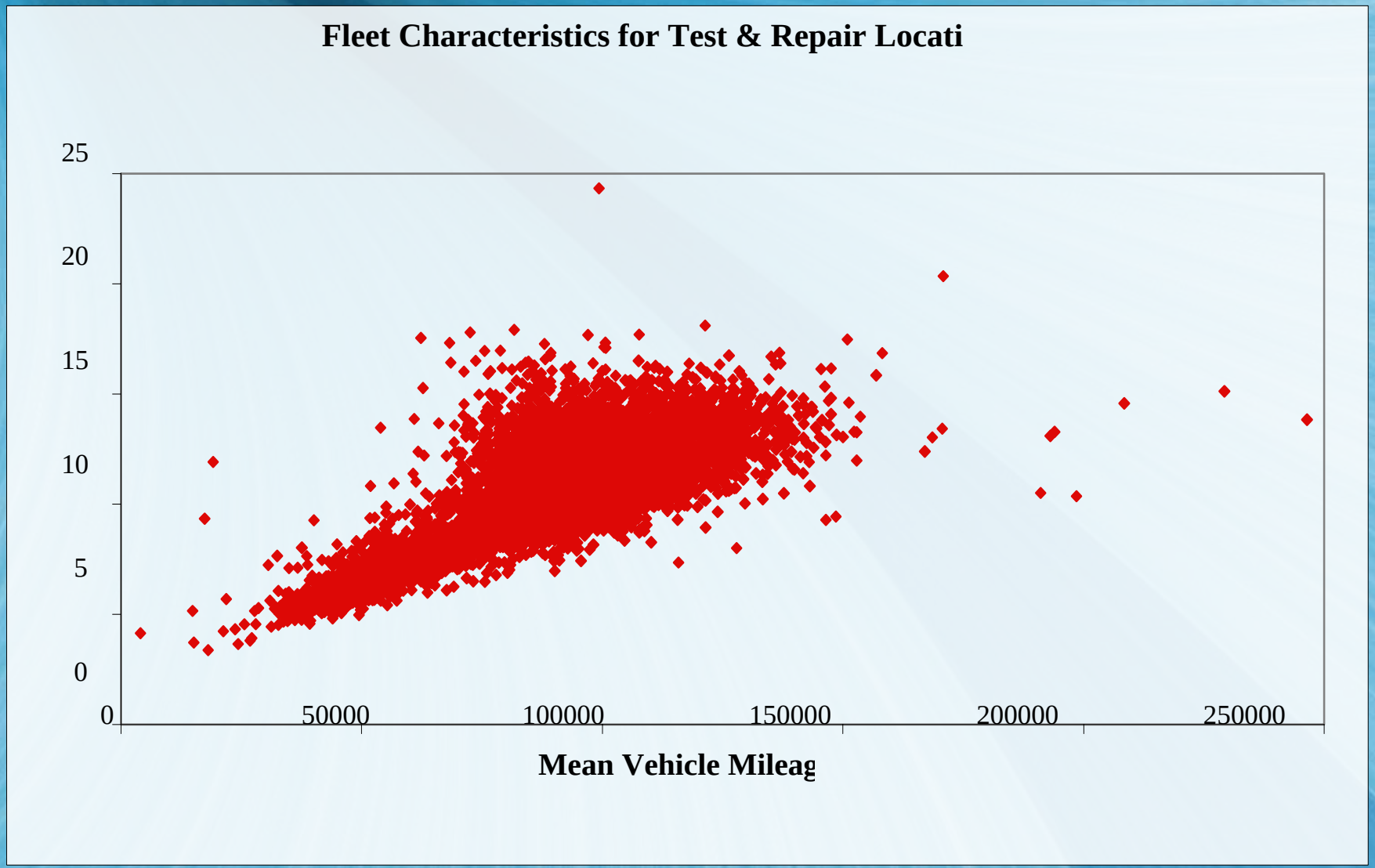
- I have organized the 22,554 station IDs into 11,068 unique location codes
- Thus, by my definition from January 1, 1998 through December 31, 2006, there were 11,068 Smog Check stations in operation

Location	Station ID	Name	Address	Dates
9369	RF178774	Apex Auto	5800 San Fernando	01/98-02/98
9369	RG184904	Apex Auto	5800 San Fernando	04/99-05/02
9369	RM202678	Highland Pros	5800 San Fernando	05/02-12/06

Station Classification

- Now that we have a criteria for defining Smog Check stations, how do we classify these stations?
  - There are currently two main classifications:
    - Test & Repair
    - Test Only
- By putting stations into the same class we assume that they have similar characteristics, but do they?


Inspetion Volume and Mean Mileage by Classif
200000
180000
160000
140000
120000
100000
80000
60000
40000
20000
0
0
50000
100000
150000
200000
250000
Test & Repair Throughc
Test Only Throughout
Mean Vehicle Milea


Fleet Characteristics for Test & Repair Locati
25
20
15
10
5
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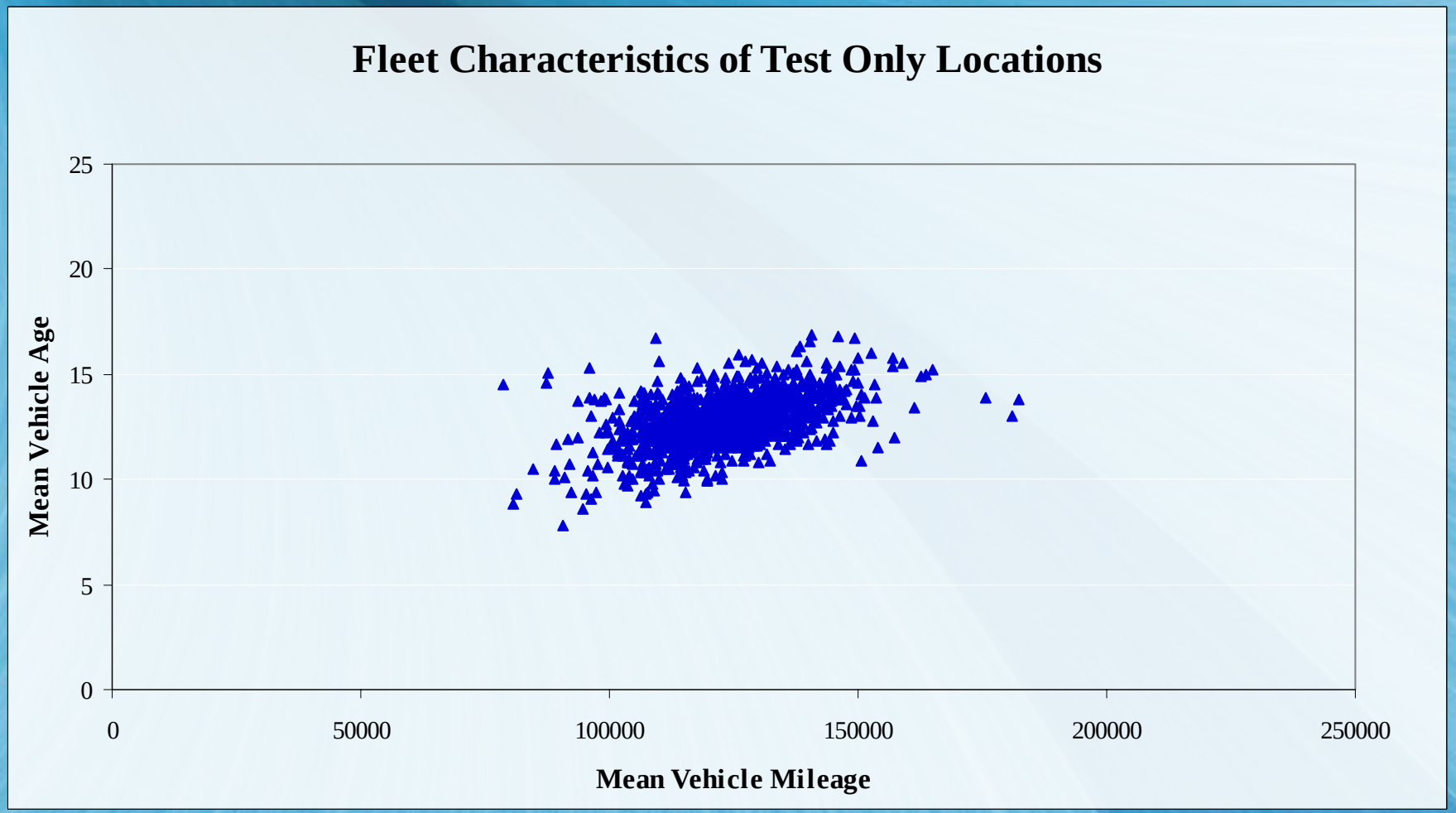
0
50000
100000
150000
200000
250000
Mean Vehicle Mileag


Fleet Characteristics of Test Only Locations
Mean Vehicle Age
25
20
15
10
5
0
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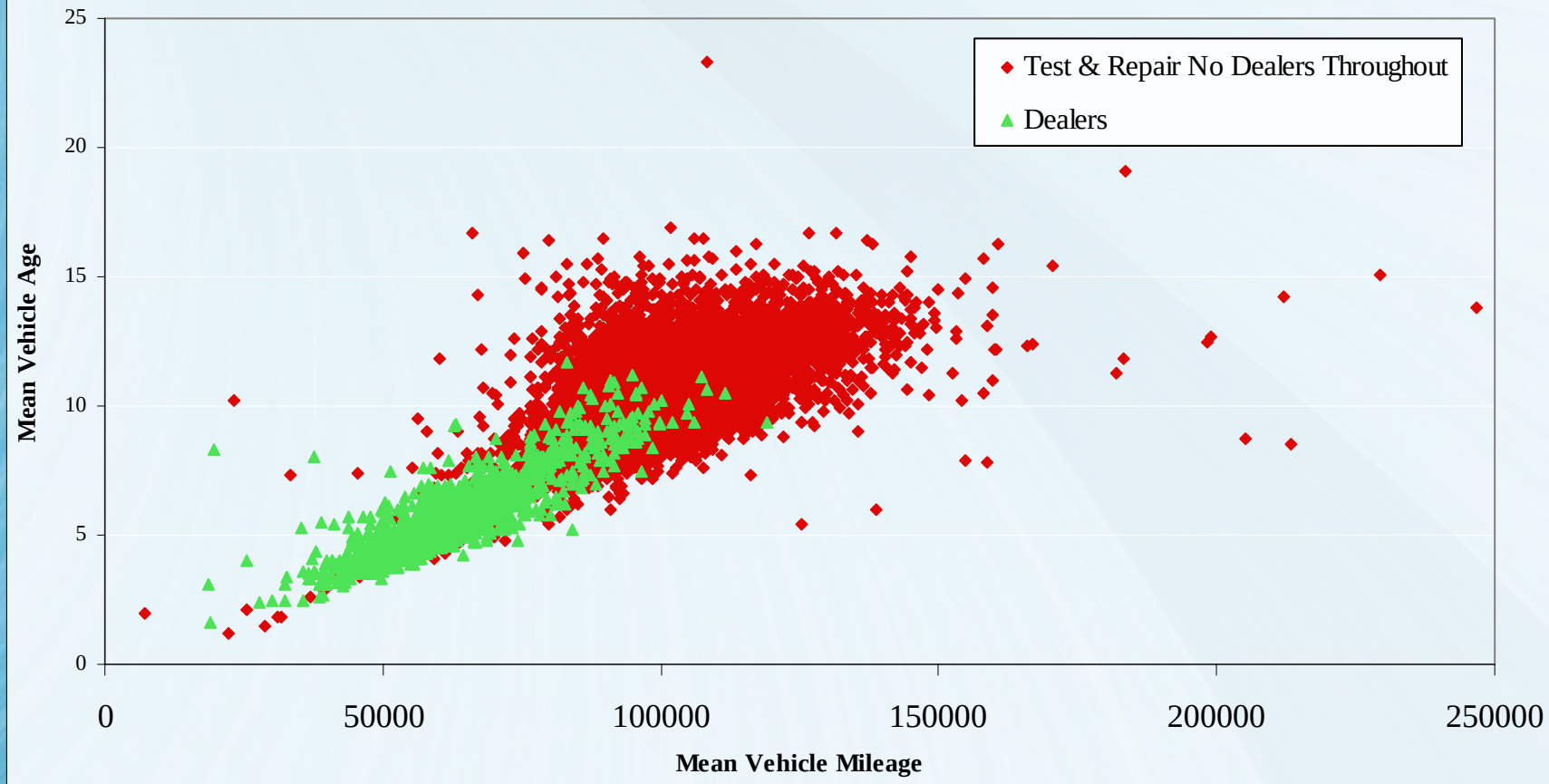
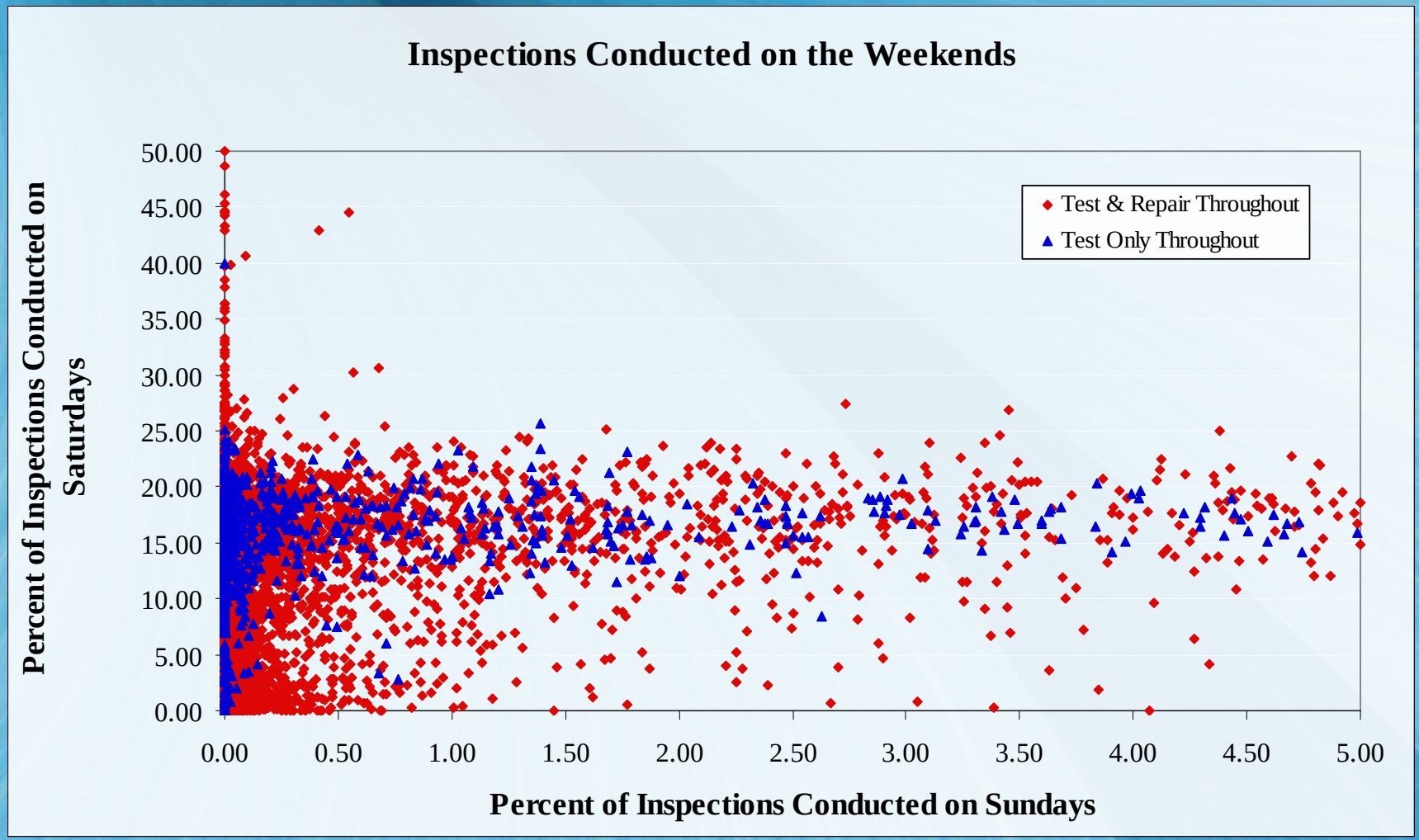
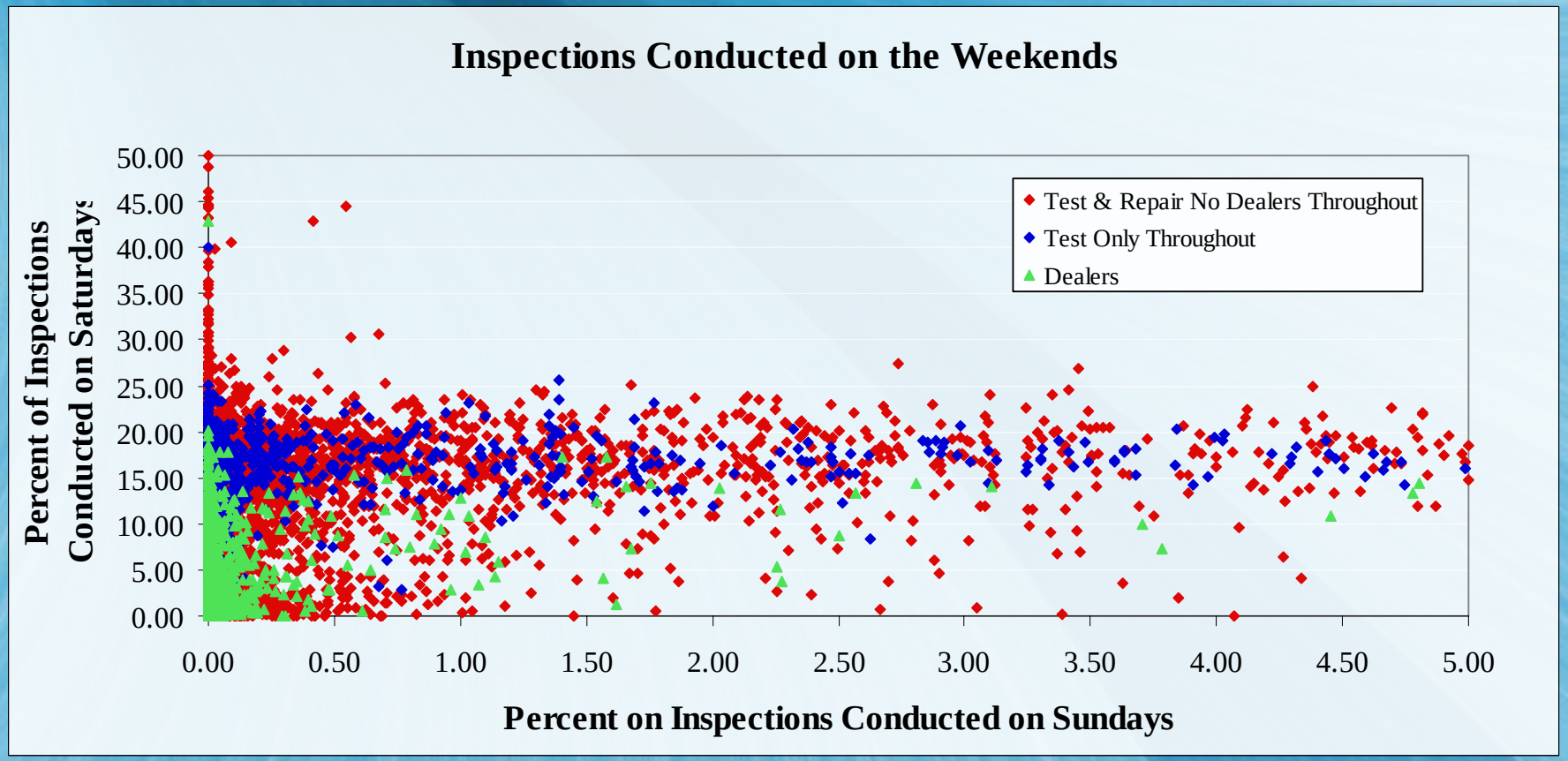
50000
100000
150000
200000
250000
Mean Vehicle Mileage

Fleet Characteristics of Non Dealer Test & Repair and Dealer Locations

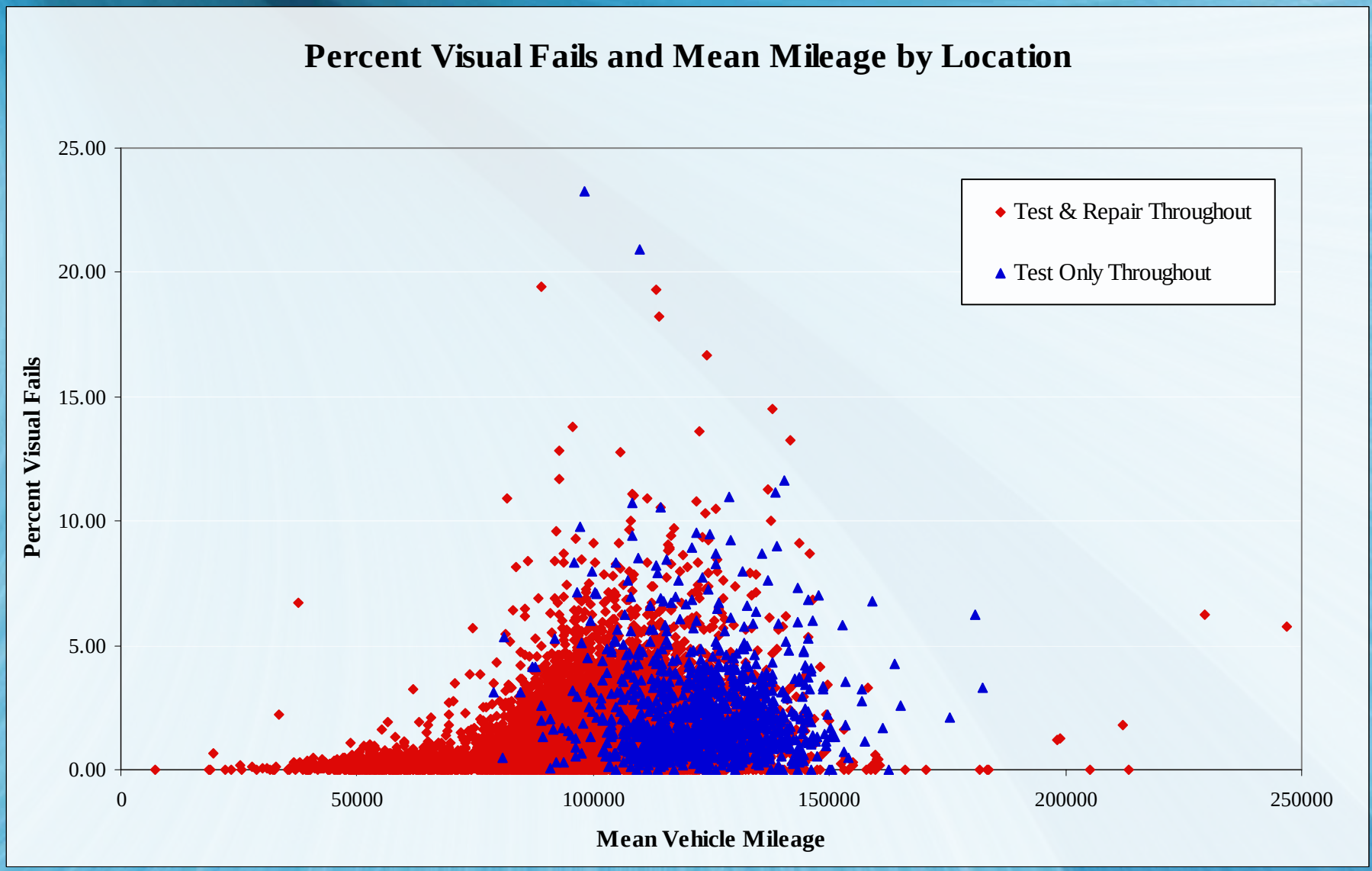


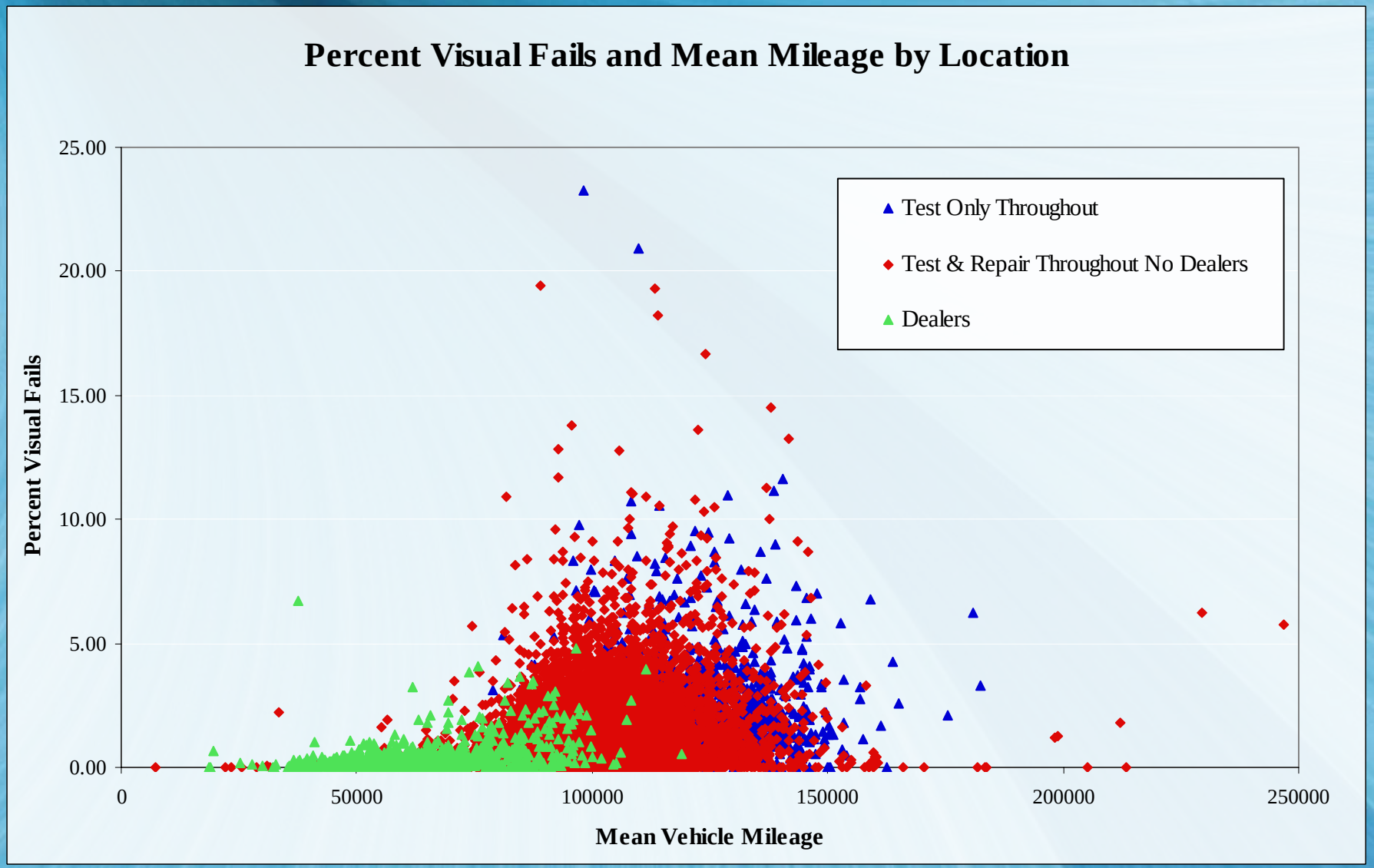

Inspections Conducted on the Weekends
Percent of Inspections Conducted on Saturdays
50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
5.00
Percent of Inspections Conducted on Sundays
Test & Repair Throughout
Test Only Throughout


Inspections Conducted on the Weekends
Percent of Inspections Conducted on Saturdays
50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
5.00
Percent on Inspections Conducted on Sundays
Test & Repair No Dealers Throughout
Test Only Throughout
Dealers

The Bottom Line

- So do stations within a classification inspect a similar fleet of vehicles?
  - Not really, especially for Test & Repair stations
- Are the vehicle fleets of different classifications similar?
  - While there is more variance within the fleets of Test & Repair stations, it is not that different from the fleet of Test Only stations
- Should Dealers be a new classification?
  - We need more evidence, but possibly


Percent Visual Fails and Mean Mileage by Location
25.00
20.00
15.00
10.00
5.00
0.00
Percent Visual Fails
0
50000
100000
150000
200000
250000
Mean Vehicle Mileage
Test & Repair Throughout
Test Only Throughout


Percent Visual Fails and Mean Mileage by Location
25.00
20.00
15.00
10.00
5.00
0.00
Percent Visual Fails
0
50000
100000
150000
200000
250000
Mean Vehicle Mileage
Test Only Throughout
Test & Repair Throughout No Dealers
Dealers

The Bottom Line

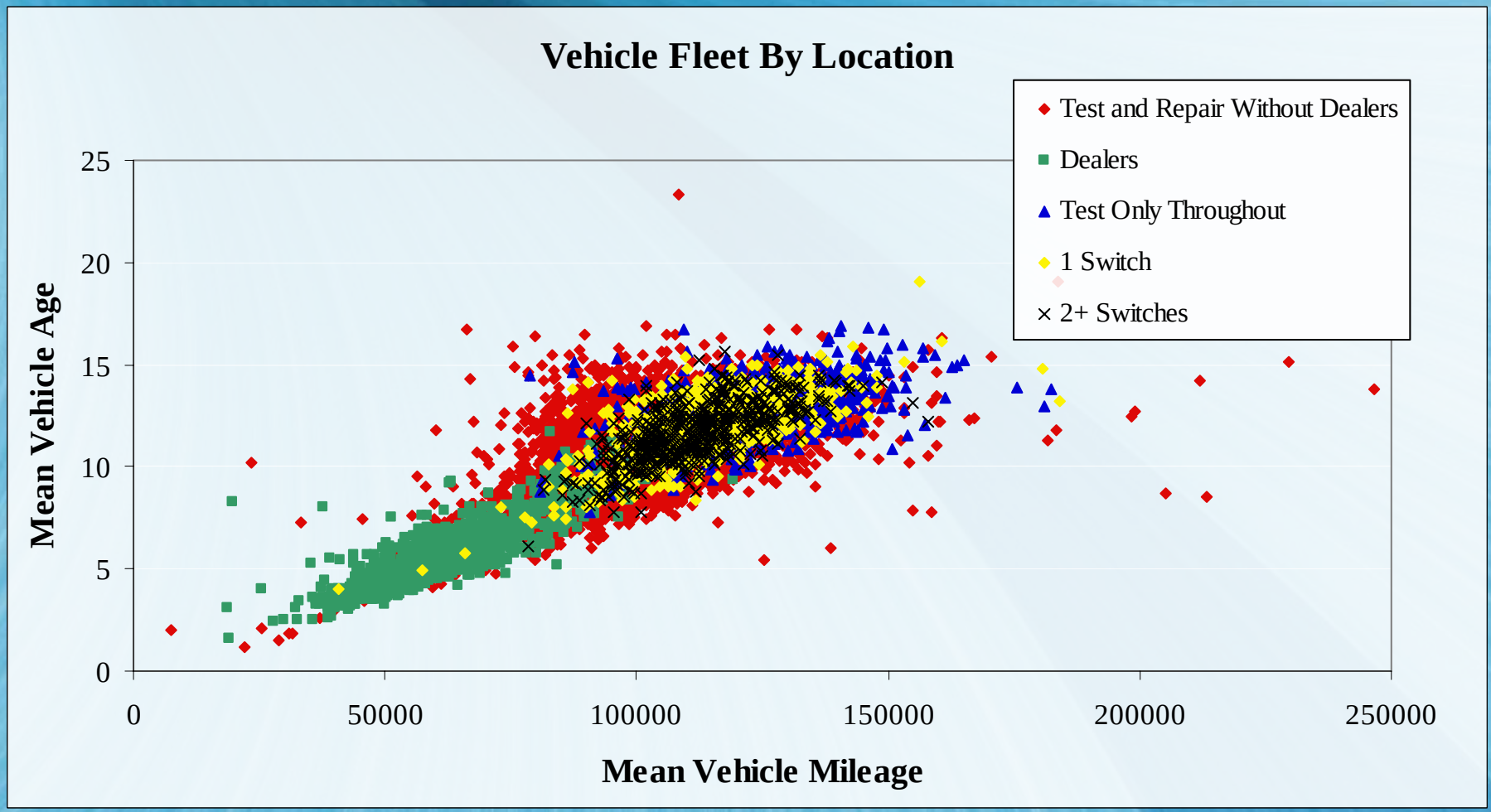
- So is the percentage of visual fails uniform within station classifications?
  - No, especially in the Test & Repair classification
  - Creating a Dealer category make the Test & Repair classification more uniform

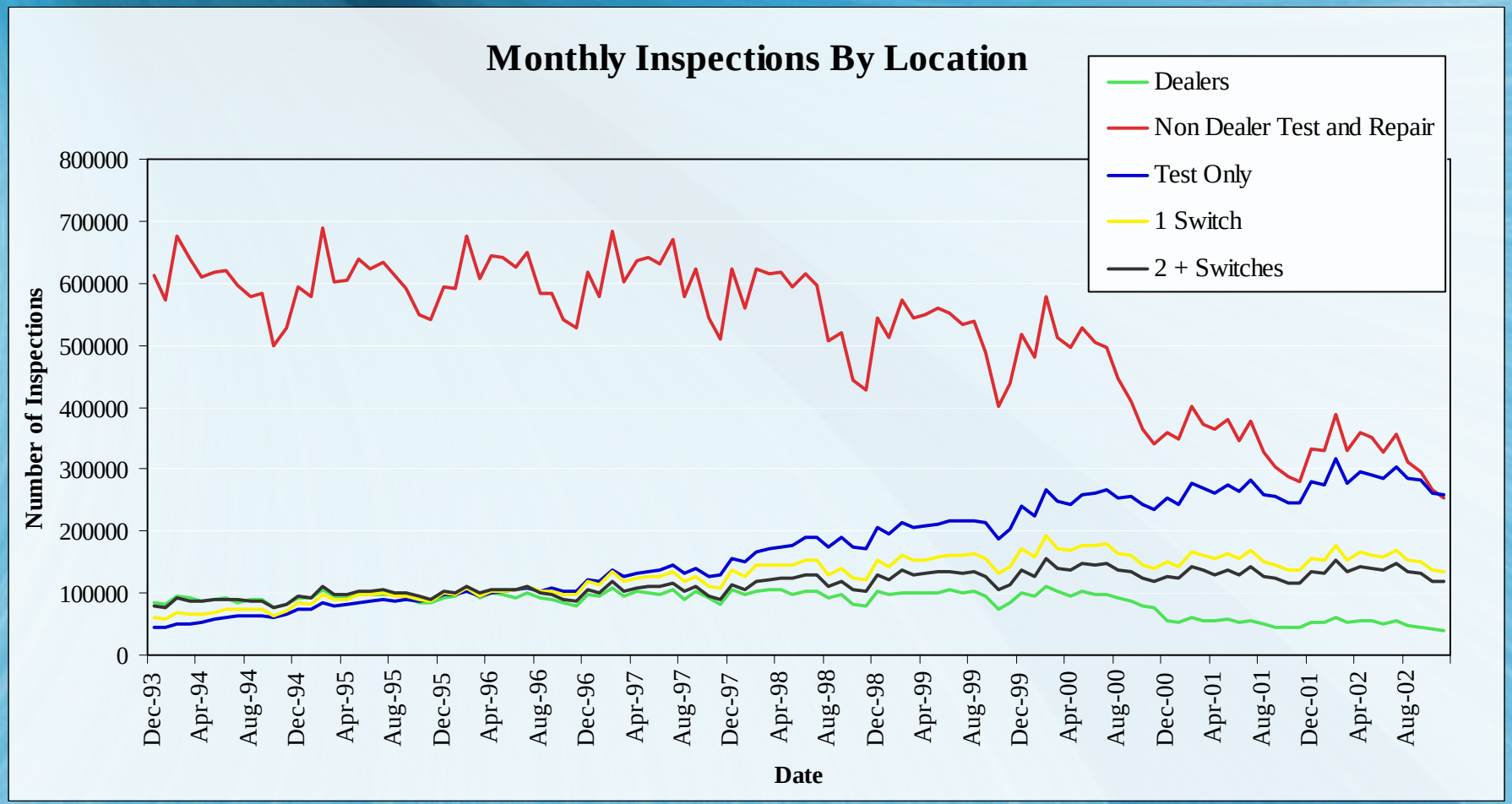
Can Stations Switch Classification?

- Of 11,068 unique station locations
  - 8388 stations were classified as Test & Repair throughout the 9 year dataset
  - 1322 stations were classified as Test Only throughout
  - 653 stations switched once between the Test & Repair and Test Only classifications
  - 549 stations switched two or more times between classifications

Switching Stations

- 265 times stations switched from Test Only to Test & Repair classification
- 937 times stations switched from Test & Repair to Test Only classification
- Of the stations that switched classifications 61 were located in the Bay Area


Vehicle Fleet By Location
Test and Repair Without Dealers
Dealers
Test Only Throughout
1 Switch
2+ Switches
Mean Vehicle Age
0
5
10
15
20
25
0
50000
100000
150000
200000
250000
Mean Vehicle Mileage


Monthly Inspections By Location
Dealers
Non Dealer Test and Repair
Test Only
1 Switch
2 + Switches
Number of Inspections
800000
700000
600000
500000
400000
300000
200000
100000
0
Dec-93
Apr-94
Aug-94
Dec-94
Apr-95
Aug-95
Dec-95
Apr-96
Aug-96
Dec-96
Apr-97
Aug-97
Dec-97
Apr-98
Aug-98
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Aug-00
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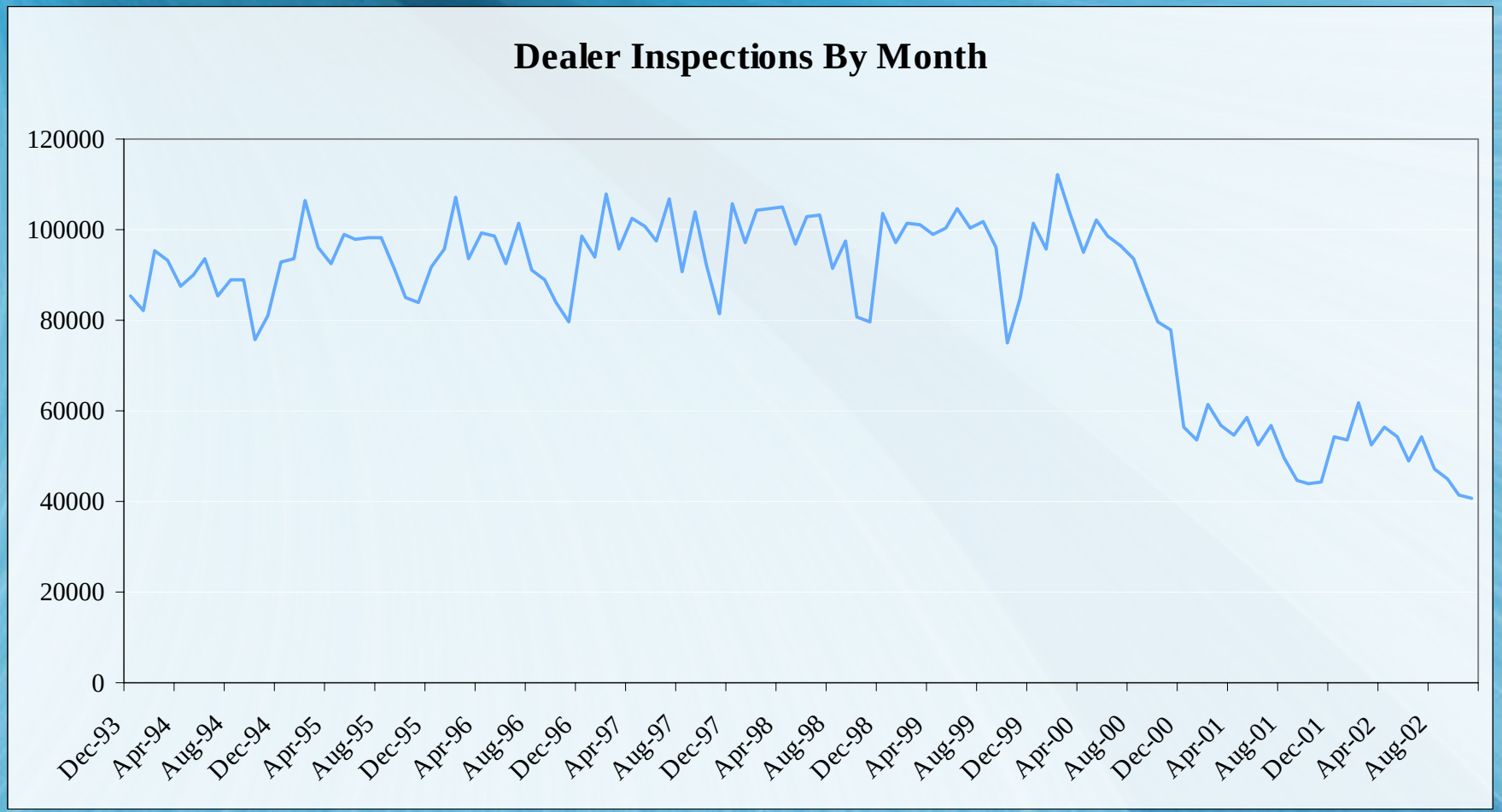
Apr-01
Aug-01
Dec-01
Apr-02
Aug-02
Date


Dealer Inspections By Month
120000
100000
80000
60000
40000
20000
0
Dec-93
Apr-94
Aug-94
Dec-94
Apr-95
Aug-95
Dec-95
Apr-96
Aug-96
Dec-96
Apr-97
Aug-97
Dec-97
Apr-98
Aug-98
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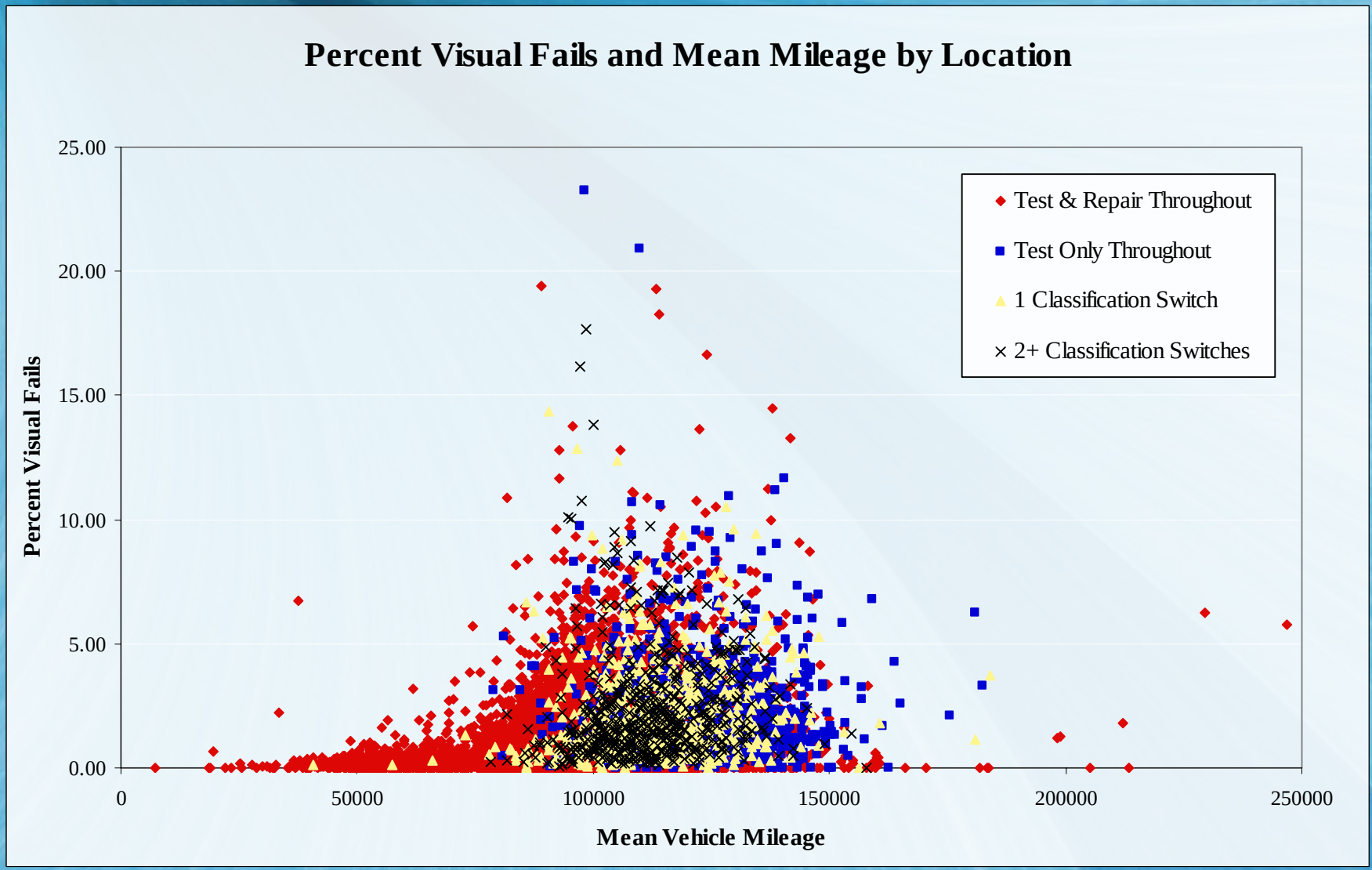
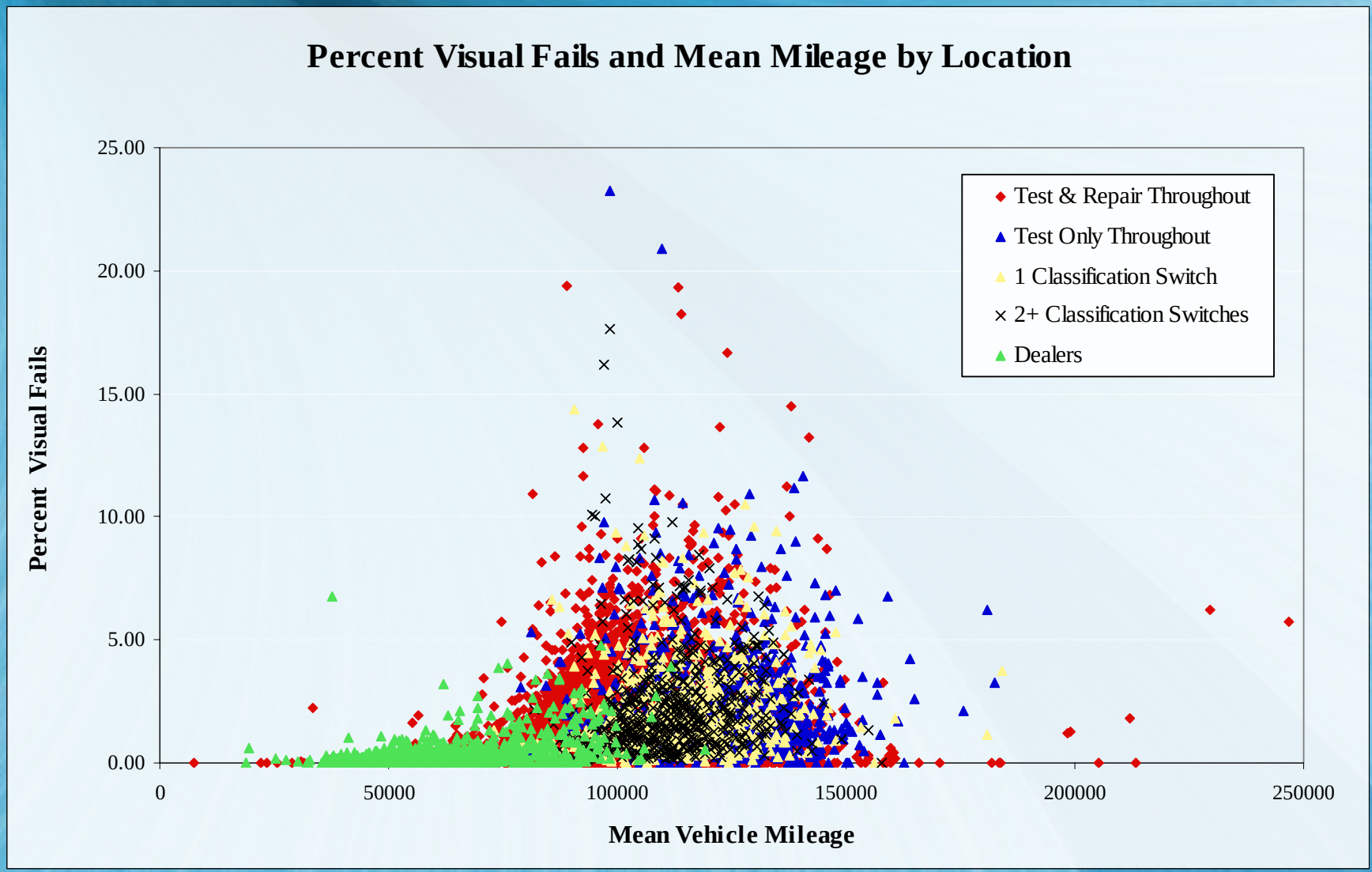
Apr-01
Aug-01
Dec-01
Apr-02
Aug-02


Percent Visual Fails and Mean Mileage by Location
25.00
20.00
15.00
10.00
5.00
0.00
Percent Visual Fails
0
50000
100000
150000
200000
250000
Mean Vehicle Mileage
Test & Repair Throughout
Test Only Throughout
1 Classification Switch
2+ Classification Switches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15.00
10.00
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0.00
Percent Visual Fails
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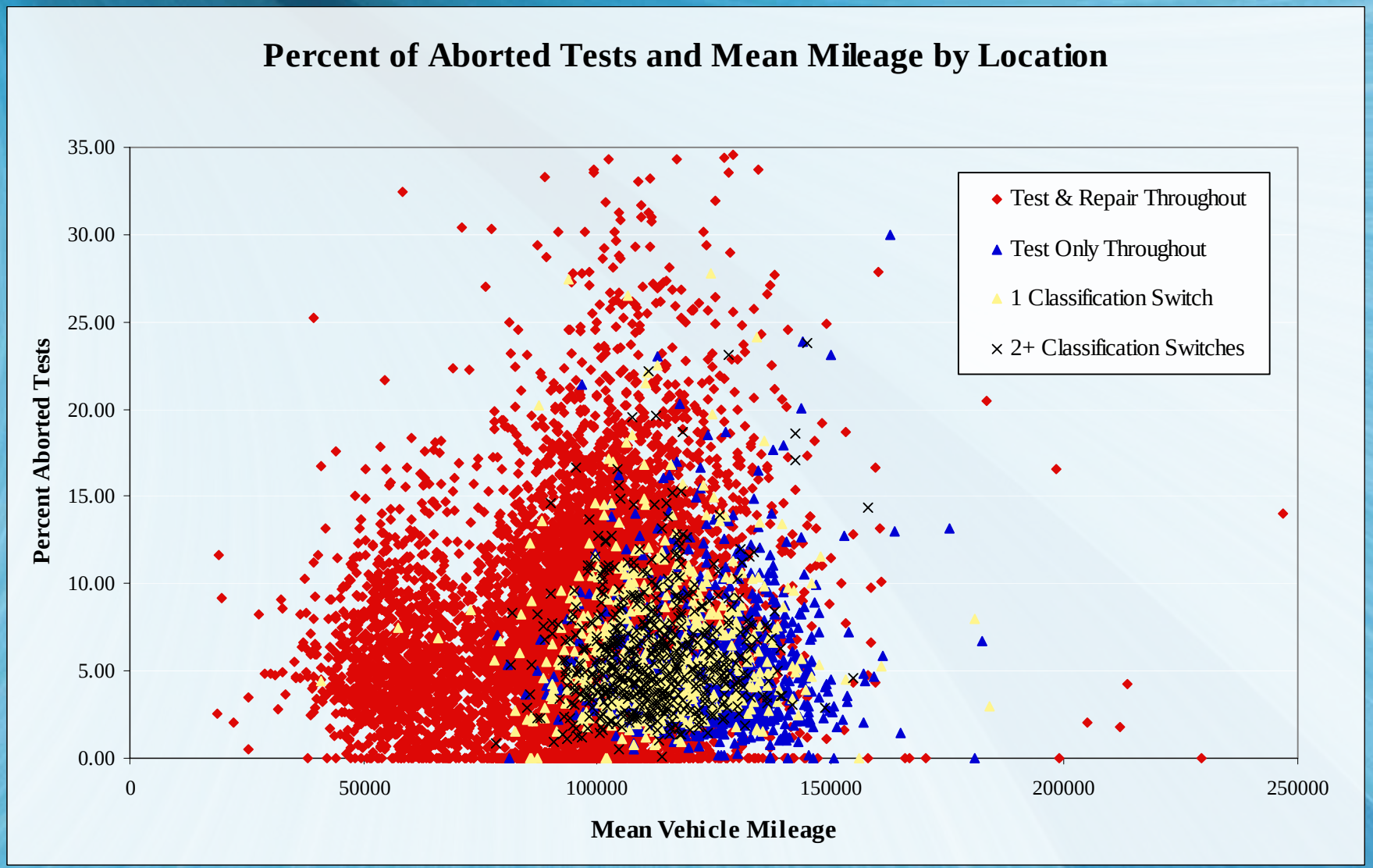
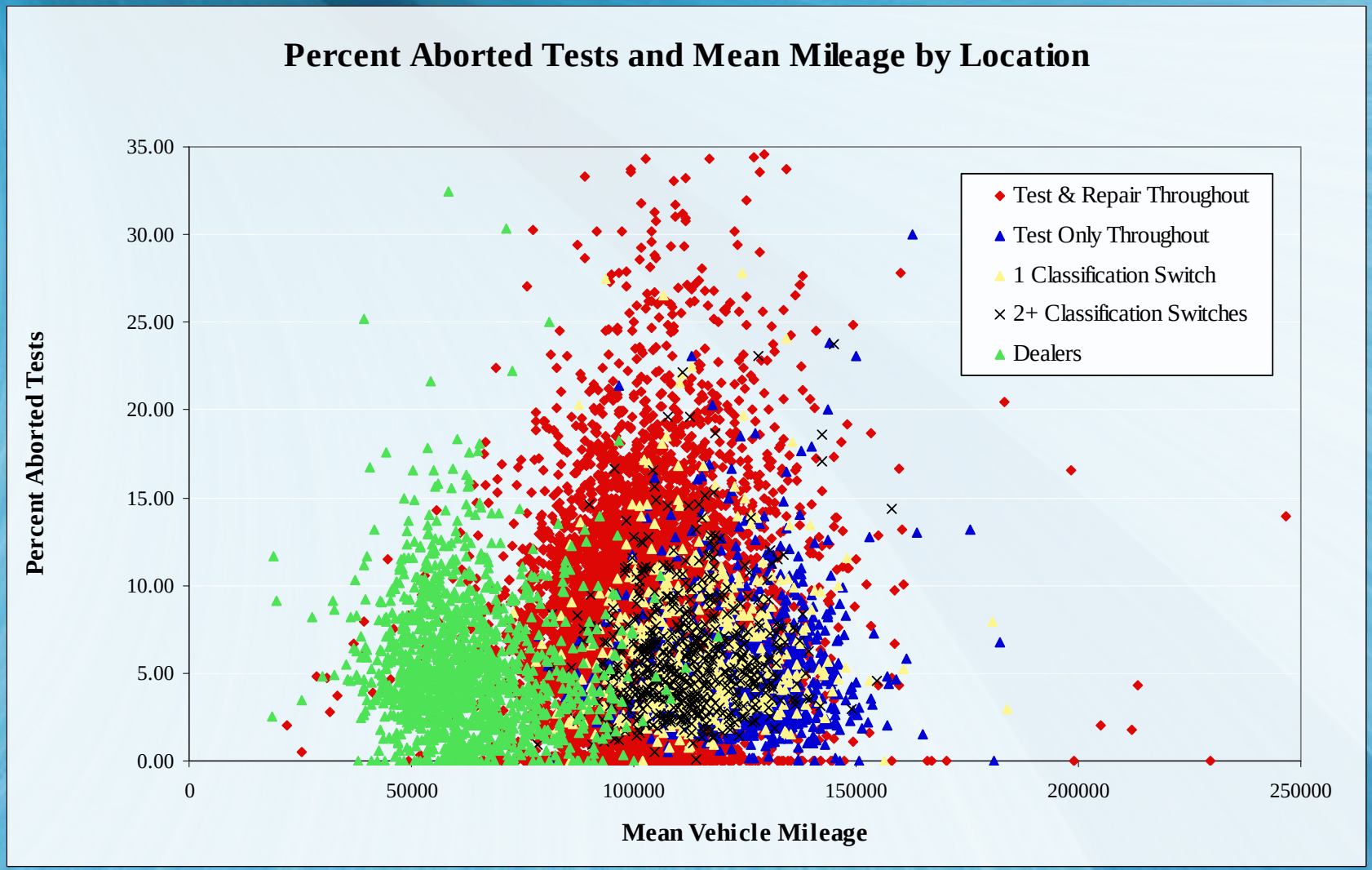
250000
Mean Vehicle Mileage
Test & Repair Throughout
Test Only Throughout
1 Classification Switch
2+ Classification Switches
Dealers


Percent of Aborted Tests and Mean Mileage by Location
Percent Aborted Tests
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
0
50000
100000
150000
200000
250000
Mean Vehicle Mileage
Test & Repair Throughout
Test Only Throughout
1 Classification Switch
2+ Classification Switches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Percent Aborted Tests
35.00
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10.00
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150000
200000
250000
Mean Vehicle Mileage
Test & Repair Throughout
Test Only Throughout
1 Classification Switch
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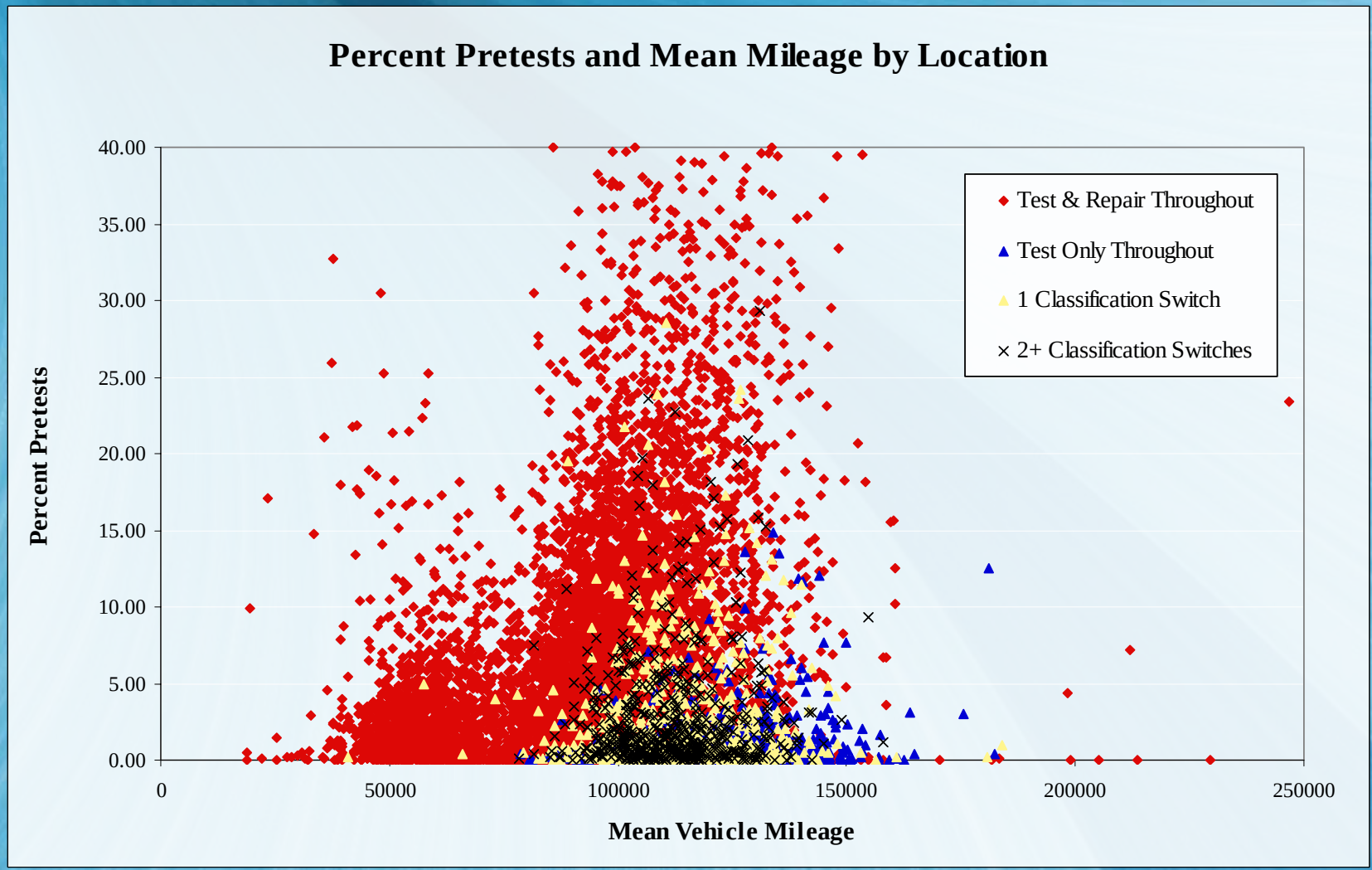
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Percent Pretests
40.00
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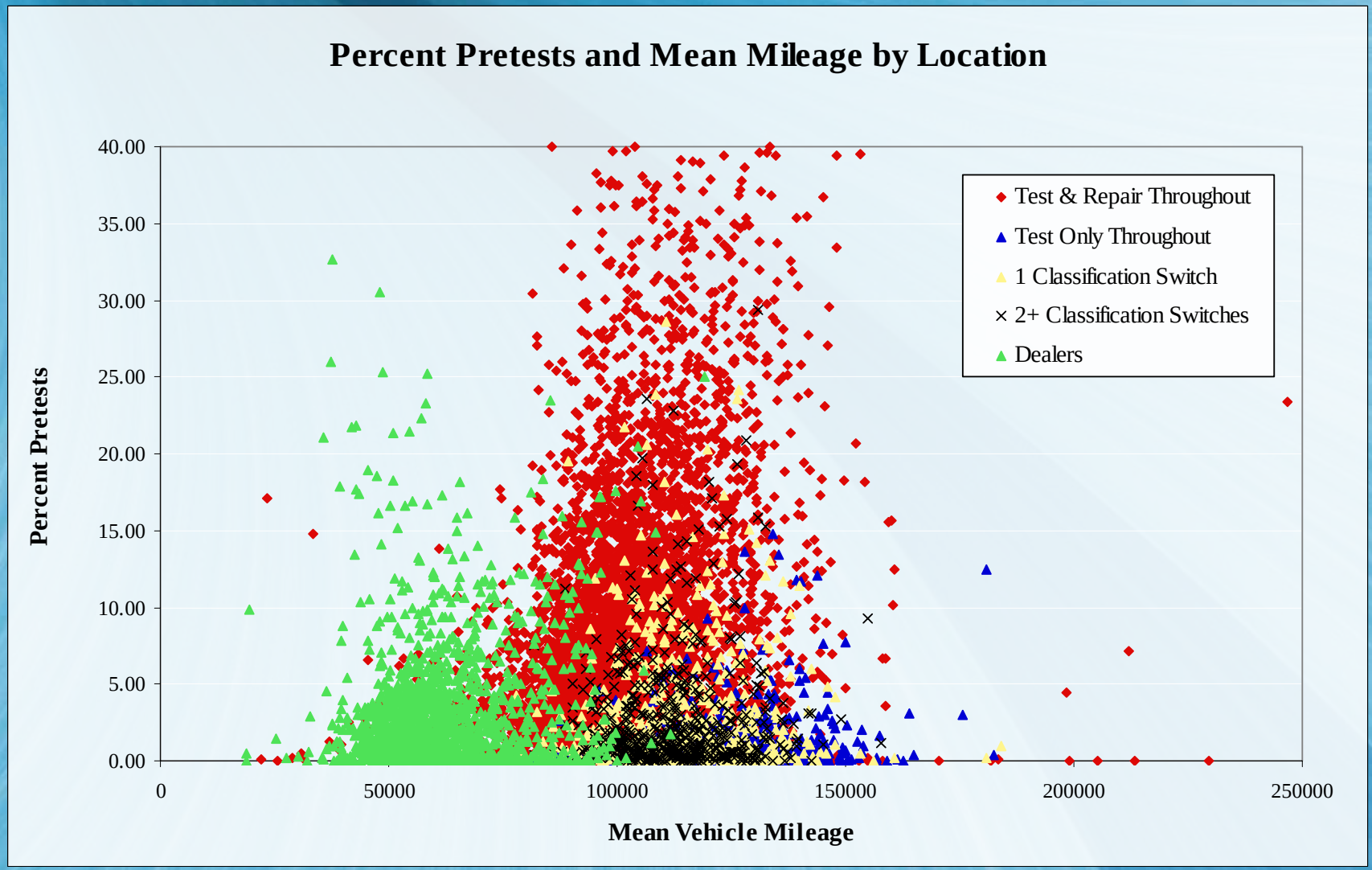
250000
Mean Vehicle Mileage
Test & Repair Throughout
Test Only Throughout
1 Classification Switch
2+ Classification Switches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Percent Pretests
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10.00
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150000
200000
250000
Mean Vehicle Mileage
Test & Repair Throughout
Test Only Throughout
1 Classification Switch
2+ Classification Switches
Dealers

The Bottom Line

- Stations can, and do, switch between classifications
- Stations that switch classification are not uniform and vary greatly in their fleet of inspected vehicles, percentage of visual fails, percentage of pretests, and percentage of aborts

Conclusions, Or Have I Answered Any Questions??

- Using station location to define Smog Check stations makes sense from both the perspective of the industry and consumers
- Stations within the standard classifications are not uniform
  - Creating a separate Dealer classification helps the Test & Repair classification become more uniform
- Stations do switch between classifications

More Questions, Of Course!

- How have specific regulations affected station classifications and the entry and exit of stations into the market?
- How do Smog Check technicians fit into this picture?
- What can we learn from the movement of technicians and machines between stations and classifications?